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ROTARY ELECTRIC MACHINE

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ROTARY ELECTRIC MACHINE

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Claim

1. A rotary electric machine characterized by the fact that in sealing the inside of a terminal base of a lead wire leading part provided to the stator frame of a rotary electric machine with a sealing compound, a terminal base is provided so that a lead wire terminal board displayed with terminal markings and with lead wire holes is attached concentrically to the end face of the terminal base which is the lead wire through hole of the stator frame by inserting in a projected state, the lead wires from the respective windings within the machine are led out from this lead wire hole, and the terminal box is attached to the end of the terminal base by the through hole of the terminal box being loosely fitted with the outer projected periphery of said lead wire terminal board as a spigot.

2. The rotary electric machine according to Claim 1, wherein the lead wire terminal board that is attached by inserting has a cup shape cross section and the periphery is mounted to the through hole of the terminal base according to a spring back function.

Detailed description of the invention

Industrial application field

The present invention relates to an improved rotary electric machine provided with a terminal base that seals the lead wire leading part.

Technical background of the invention and problems thereof

In a rotary electric machine, sealing performance is necessary in accordance with various specifications. For example, in the case of an explosion-proof type rotary electric machine, it is necessary for arcs and flames generated within the rotary electric machine to not leak outside the rotary electric machine. In the case of a dust explosion type rotary electric machine, it is necessary for dust floating outside the rotary electric machine to not infiltrate into the rotary electric machine. At the section where sealing performance can pose a problem, the lead wire leading part of the terminal base is located. The configuration of the lead wire leading part of the terminal base in a conventional rotary electric machine wherein sealing performance is required as described above will be described by referring to figures. Figure 1 is a horizontal cross-sectioned view of a rotary electric machine and Figure 2 is a cross-sectioned elevation view along line II-II in Figure 1 that excludes the terminal box. A plurality of lead wires (2) connected to stator winding (1) pass through lead wire passage (4) provided within stator frame (3) in the axial direction and lead wires (2) are led outside the machine from through hole (6a) of terminal base (6) that opens at the side face at approximately the center of stator core (5) in the axial direction. Lead wires (2) that were led out are inserted into a plurality of perforated lead wire holes (7a) of lead wire temporary fixing jig (7) shown in Figure 3 in an enlarged oblique view and this lead wire temporary fixing jig (7) is temporarily clamped and fixed in a sealed state to end face (6b) of terminal base (6) with a plurality of mounting bolts (8) through mounting bolt holes (7b). Thereafter, sealing compound (9) is filled and solidified in terminal base (6) and the peripheral section of stator core (5) in lead wire passage (4) of terminal base (6), and lead wires (2) are fixed and sealed within lead wire passage (4). Next, lead wire temporary fixing jig (7) is detached from end face (6b) of terminal base (6) by removing mounting bolts (8), tape (10) printed with terminal markings is adhered respectively to lead wires (2), crimp-style terminals (11) are fixed to the respective terminals of lead wires (2), terminal box (12) is clamped and fixed concentrically to end face (6b) of terminal base (6) with mounting bolts (8), and terminal box cover (13) is mounted.

In the aforementioned configuration of terminal base (6), there is the inconvenience of mounting lead wire temporary fixing jig (7) and removing after sealing compound (9) solidifies when filling sealing compound (9) in lead wire passage (4) and fixing lead wires (2) in a sealed state and there is a disadvantage of damaging the outer cover insulation of lead wire (2) during the removal since lead wire holes (7a) are pulled away from lead wires (2). Also, sealing compound (9) is adhered to the surface of lead wire temporary fixing jig (7) and the inner circumference of lead wire holes (7a) hence there is the inconvenience of needing to remove the sealing compound. Also, fixing of tape (10) and crimp-style terminals (11) to the terminals of lead wires (2) needs to be done after sealing compound (9) has solidified and lead wire temporary fixing jig (7) has been removed, hence there is a disadvantage of degradation of the workability. Furthermore, when mounting at the site for installing the rotary electric machine by changing the direction of lead screw (12a) of terminal box (12), for example, when removing mounting bolts (8) at four places in the order of (8a), (8b), and (8c) as indicated in Figure 4 as a side view of Figure 1 along line IV-IV, terminal box (12) rotates in the direction of arrow (14) if it is not held securely by hand. Namely, terminal box (12) rotates with mounting bolt (8) as the center due to the dead weight of terminal box (12) as indicated in Figure 5 and there is a disadvantage of lead wires (2) being disconnected or damaged by the edge of through hole (12b) of terminal box (12).

Objective of the invention

The present invention was achieved by giving consideration to the situation noted above and the objective is to alleviate conventional disadvantages, improve on the workability of the lead wire leading sealing device, and to provide a rotary electric machine provided with a terminal base that prevents lead wire disconnection and damage when removing the terminal box at the site for installing the rotary electric machine.

Embodiments of the invention

Below, application examples of the present invention will be described by referring to figures. The same symbols are appended to the same parts as in the aforementioned conventional example and detailed description will be omitted. Figure 6 is an enlarged oblique view of a lead wire terminal board showing an application example of the present invention and Figure 7 is a horizontal cross-sectioned view of a rotary electric machine in the present invention. Lead wire terminal board (15) is formed from, for example, a metal plate or a laminated compound, synthetic resin, etc. A plurality of leading holes (15a) for lead wires (2) are perforated in lead wire terminal board (15) and formed by displaying terminal markings (T1) - (T6) of lead wires (2). Next, a plurality of lead wires (2) connected to stator winding (1) are passed through lead

wire passage (4) provided to stator frame (3) in the axial direction, and lead outside of the machine from through hole (6a) of terminal base (6). The terminals of lead wires (2) are lead outside the machine from leading holes (15a) of lead wires (2) by corresponding respectively with terminal markings (T1) - (T6) displayed on lead wire terminal board (15). Lead wire terminal board (15) is positioned concentrically with through hole (6a) of terminal base (6) and lead wire terminal board (15) is clamped and fixed in a sealed state to end face (6b) of the terminal base by passing mounting bolts (8) in mounting bolt holes (15b) of lead wire terminal board (15). Also, sealing compound (9) is filled in the peripheral section of stator core (5) in lead wire passage (4) and within terminal base (6) and crimp-style terminals (11) are fixed to the terminals of lead wires (2) during the time sealing compound (9) is solidifying. In accordance with the above, outer spigot (15c) that projects by just the amount of the major diameter thickness of lead wire terminal board (15) is provided to end face (6b) of terminal base (6). Then after filling sealing compound (9) in lead wire passage (4) and terminal base (6), through hole (12b) of terminal box (12) is loosely inserted into outer spigot (15c) of lead wire terminal board (15), terminal box (12) is clamped and fixed in a sealed state to end face (6b) of terminal base (6) with clamping bolts (8), and terminal end cover (13) is mounted.

Effect of the invention

Due to the aforementioned constitution, the present invention eliminates conventional lead wire temporary fixing jig (7), provides lead wire terminal board (15) that functions also as conventional lead wire temporary fixing jig (7) that eliminates the problem of the necessity of removal after filling and solidifying sealing compound (9) as was necessary in the prior art, and has the effect of improving on the disadvantage of the outer cover insulation of lead wires (2) being damaged. Also, fixing of crimp-style terminals (11) to the terminals of lead wires (2) was inconvenient in the prior art since it was executed after sealing compound (9) had solidified and lead wire temporary fixing jig (7) was removed. However, according to the present invention, there is the effect of the workability improving since this operation can be executed immediately after filling sealing compound (9). Also, terminal markings (T1) - (T6) are displayed on lead wire terminal board (15) hence the problem of adhering terminal marking tape (10) to lead wires (2) as was done in the prior art can be omitted. Furthermore, through hole (12b) of terminal box (12) is loosely inserted and hitched to outer spigot (15c) having a width of the major diameter thickness of lead wire terminal board (15) mounted concentrically to end face (6b) of terminal base (6), and even though mounting bolts (8) of terminal box (12) are removed as in the prior art, lead wires (2) are not disconnected or damaged by the sharp edge of through hole (12a) in terminal box (12) due to terminal box (12) rotating in a state of being hung on mounting bolts (8) as in the prior art.

The present invention is not restricted to the aforementioned constitution. To show another application example, Figure 8 is an enlarged frontal view of a cup shape lead wire terminal board, Figure 9 is a cross sectioned view along line IX-IX in Figure 8, and Figure 10 is a cross sectioned view of a rotary electric machine showing the other application example. Cup shape lead wire terminal board (16) is formed with metal or synthetic resin, open part (16b) of the cup is faced to the through hole (6a) side of terminal base (6), and a plurality of lead wires (2) are lead out from lead wire leading holes (16a). Terminal markings (T1) - (T6) of lead wires (2) are displayed at lead wire leading hole (16a). If the major diameter of lead wire terminal board (16) is formed to be slightly larger than the minor diameter of through hole (6a) as shown in Figure 10, cup shape lead wire terminal board (16) can be fitted firmly with through hole (6a) of terminal base (6) according to a spring back function. Furthermore, cup shape bottom part (16d) is projected to the outside from end face (6b) of terminal base (6) in stator frame (3), sealing compound (9) is filled and solidified in terminal base (6), open part (16b) of cup shape lead wire terminal board (16), and peripheral section of stator core (5) in lead wire passage (4) of terminal base (6), and lead wires (2) are sealed and fixed in lead wire passage (4). Next, through hole (12b) of terminal box (12) is loosely inserted into periphery (16c) of cup shape lead wire terminal board (16), terminal box (12) is clamped and fixed in a sealed state to end face (6b) of terminal base (6) with clamping bolts (8), and terminal box cover (13) is mounted. The functional effects of this application example are the same as the functional effects of the present application.

Brief description of the drawings

Figure 1 is a horizontal cross-sectioned view of a conventional rotary electric machine, Figure 2 is a cross-sectioned elevation view along line II-II in Figure 1, Figure 3 is an oblique view of a conventional lead wire temporary fixing jig, Figure 4 is a side view of Figure 1 along line IV-IV, Figure 5 is a frontal view showing the rotation of the terminal box in Figure 4, Figure 6 is an enlarged oblique view of a lead wire terminal board showing an application example of the invention, Figure 7 is a horizontal cross sectioned view of a rotary electric machine that shows an application example of the present invention, Figure 8 is an enlarged frontal view of a lead wire terminal board showing another application example, Figure 9 is a cross sectioned view of Figure 8 along line IX-IX, and Figure 10 is a horizontal cross sectioned view of a rotary electric machine showing the other application example.

(2)...lead wire, (3)...stator frame, (6)...terminal base, (6a)...through hole of the terminal base, (6b)...end face of the terminal base, (9)...sealing compound, (12)...terminal base [sic; box], (12a)...lead screw, (12b)...through hole, (15)...lead wire terminal board, (15a),

(16a)...lead wire leading hole, (15c)...outer spigot, (16)...cup shape lead wire terminal board,
 (16b)...open part of the cup, (T1) - (T6)...terminal markings.

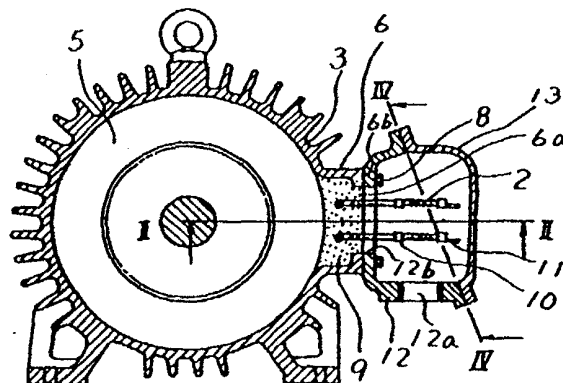


Figure 1

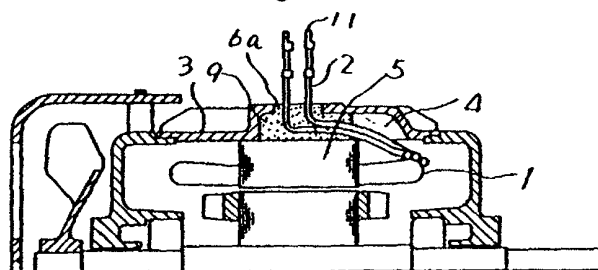


Figure 2

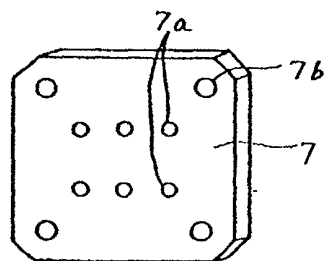


Figure 3

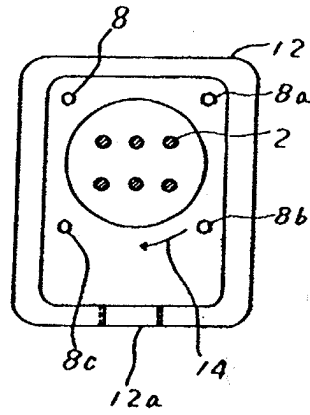


Figure 4

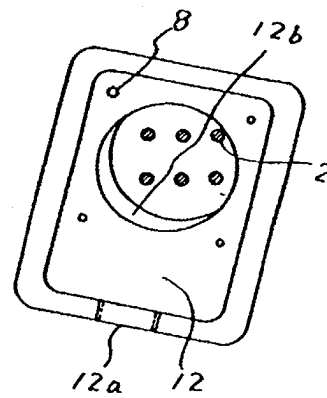


Figure 5

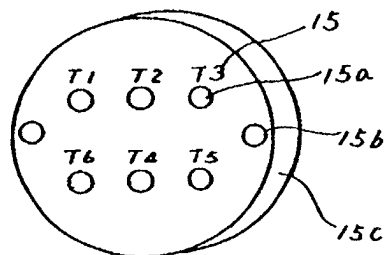


Figure 6

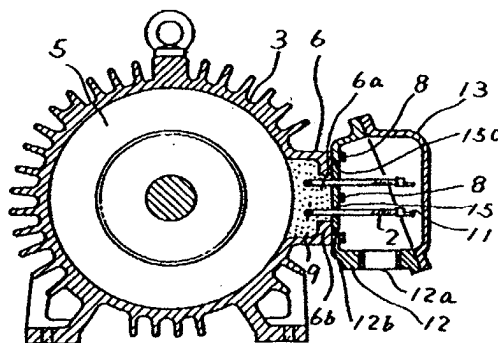


Figure 7

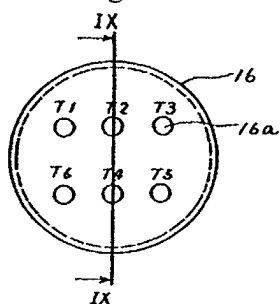


Figure 8

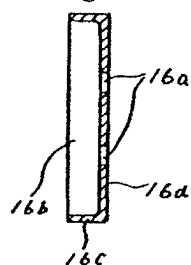


Figure 9

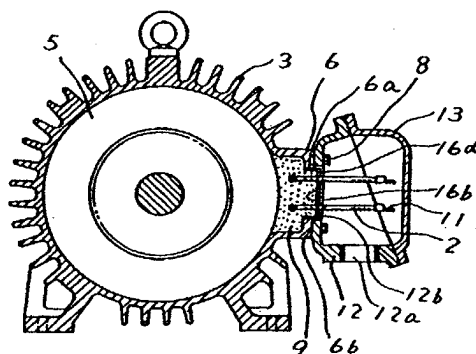


Figure 10